CLAIMS

1. A method of diagnosing or prognosticating a neurodegenerative disease in a subject, or determining whether a subject is at increased risk of developing said disease, comprising determining a level and/or an activity of

(i) a transcription product of a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or

(ii) a translation product of a gene coding for a cytosolic sulfotransferase family 4A member 1 and/or

(iii) a fragment, or derivative, or variant of said transcription or translation product,

in a sample obtained from said subject and comparing said level and/or said activity to a reference value representing a known disease or health status, thereby diagnosing or prognosticating said neurodegenerative disease in said subject, or determining whether said subject is at increased risk of developing said neurodegenerative disease.

2. The method according to claim 1 wherein said neurodegenerative disease is Alzheimer's disease.

3. The method according to claims 1 and 2 wherein said cytosolic sulfotransferase family 4A member 1 is the cytosolic sulfotransferase family 4A member 1 splice variant 1 and/or the cytosolic sulfotransferase family 4A member 1 splice variant 2.

4. A kit for diagnosing or prognosticating a neurodegenerative disease, in particular Alzheimer's disease, in a subject, or determining the propensity or predisposition of a subject to develop such a disease by the steps of:

(i) detecting in a sample obtained from said subject a level, or an activity, or both said level and said activity of a transcription product and/or of a translation product of a gene coding for a cytosolic sulfotransferase family 4A member 1, and (ii) comparing said level or activity, or both said level and said activity of a transcription product and/or of a translation product of a gene coding for a cytosolic sulfotransferase family 4A member 1 to a reference value representing a known health status and/or to a reference value representing a known disease status, and said level, or activity, or both said level and said activity, of said transcription product and/or said translation product is varied compared to a

reference value representing a known health status, and/or is similar or equal to a reference value representing a known disease status, said kit comprising:
a) at least one reagent which is selected from the group consisting of (i) reagents that selectively detect a transcription product of a gene coding for a cytosolic sulfotransferase family 4A member 1 and (ii) reagents that selectively detect a translation product of a gene coding for a cytosolic sulfotransferase family 4A member 1.

5. A method of treating or preventing a neurodegenerative disease, in particular Alzheimer's disease, in a subject comprising administering to said subject in a therapeutically or prophylactically effective amount an agent or agents which directly or indirectly affect an activity and/or a level of

(i) a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or
(ii) a transcription product of a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or
(iii) a translation product of a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or
(iv) a fragment, or derivative, or variant of (i) to (iii).

6. A genetically altered non-human animal comprising a non-native gene sequence coding for a cytosolic sulfotransferase family 4A member 1, or a fragment, or a derivative, or a variant thereof.

7. The genetically altered non-human animal according to claim 6 wherein said non-human animal is a mammal, preferably a rodent, more preferably a mouse, a rat or a guinea pig, or an invertebrate animal, preferably an insect, more preferably a fly such as the fly *Drosophila melanogaster.*

8. The genetically altered non-human animal according to claims 6 and 7, wherein the expression of said genetic alteration results in said non-human animal exhibiting a predisposition to developing symptoms, and/or displaying symptoms of neuropathology similar to a neurodegenerative disease, in particular symptoms similar to AD.

9. The genetically altered non-human animal according to claims 6 and 7, wherein the expression of said genetic alteration results in said non-human animal which

has a reduced risk of developing symptoms similar to a neurodegenerative disease, in particular a reduced risk of developing symptoms similar to AD and/or which shows a reduction of AD symptoms and/or which has no AD symptoms due to an effect caused by the expression of the gene used to genetically alter said non-human animal.

10. Use of the genetically altered non-human animal according to claims 7 to 9 for screening, testing, and validating compounds, agents, and modulators in the development of diagnostics and therapeutics to treat neurodegenerative diseases, in particular Alzheimer's disease.

11. An assay for screening for a modulator of neurodegenerative diseases, in particular Alzheimer's disease, or related diseases or disorders of one or more substances selected from the group consisting of

(i) a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or

(ii) a transcription product of a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or

(iii) a translation product of a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or

(iv) a fragment, or derivative, or variant of (i) to (iii),

said method comprising:

(a) contacting a cell with a test compound;

(b) measuring the activity and/or level of one or more substances recited in (i) to (iv);

(c) measuring the activity and/or level of one or more substances recited in (i) to (iv) in a control cell not contacted with said test compound; and

(d) comparing the levels and/or activities of the substance in the cells of step (b) and (c), wherein an alteration in the activity and/or level of substances in the contacted cells indicates that the test compound is a modulator of said diseases or disorders.

12. A method of screening for a modulator of neurodegenerative diseases, in particular Alzheimer's disease, or related diseases or disorders of one or more substances selected from the group consisting of

(i) a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or

(ii) a transcription product of a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or

(iii) a translation product of a gene coding for a cytosolic sulfotransferase family 4A member 1, and/or

(v) a fragment, or derivative, or variant of (i) to (iii),

said method comprising:

(a) administering a test compound to a test animal which is predisposed to developing or has already developed symptoms of a neurodegenerative disease or related diseases or disorders in respect of the substances recited in (i) to (iv);

(b) measuring the activity and/or level of one or more substances recited in (i) to (iv);

(c) measuring the activity and/or level of one or more substances recited in (i) or (iv) in a matched control animal which is predisposed to developing or has already developed symptoms of a neurodegenerative disease or related diseases or disorders in respect to the substances recited in (i) to (iv) and to which animal no such test compound has been administered;

(d) comparing the activity and/or level of the substance in the animals of step (b) and (c), wherein an alteration in the activity and/or level of substances in the test animal indicates that the test compound is a modulator of said diseases or disorders.

13. The method according to claim 12 wherein said test animal and/or said control animal is a genetically altered non-human animal which expresses the gene coding for a cytosolic sulfotransferase family 4A member 1, or a fragment, or a derivative, or a variant thereof, under the control of a transcriptional control element which is not the native a cytosolic sulfotransferase family 4A member 1 gene transcriptional control element.

14. An assay for testing a compound, preferably for screening a plurality of compounds for inhibition of binding between a ligand and a cytosolic sulfotransferase family 4A member 1 protein, or a fragment, or derivative, or variant thereof, said assay comprising the steps of:

(i) adding a liquid suspension of said a cytosolic sulfotransferase family 4A member 1 protein, or a fragment, or derivative, or variant thereof, to a plurality of containers;

(ii) adding a compound or a plurality of compounds to be screened for said inhibition of binding to said plurality of containers;

(iii) adding a detectable ligand, in particular a fluorescently detectable ligand, to said containers;

(iv) incubating the liquid suspension of said a cytosolic sulfotransferase family 4A member 1 protein, or said fragment, or derivative, or variant thereof, and said compound or compounds, and said ligand;

(v) measuring amounts of detectable ligand, of preferably fluorescence associated with said a cytosolic sulfotransferase family 4A member 1 protein, or with said fragment, or derivative, or variant thereof; and

(vi) determining the degree of inhibition by one or more of said compounds of binding of said ligand to said a cytosolic sulfotransferase family 4A member 1 protein, or said fragment, or derivative, or variant thereof.

15. The use of protein molecules of SEQ ID NO. 1 and/or SEQ ID NO. 2, said protein molecules being a translation products of the gene coding for a cytosolic sulfotransferase family 4A member 1, or fragments, or derivatives, or variants thereof, as diagnostic targets for detecting a neurodegenerative disease, preferably Alzheimer's disease.

16. The use of protein molecules of SEQ ID NO. 1 and/or SEQ ID NO. 2, said protein molecules being translation products of the gene coding for a cytosolic sulfotransferase family 4A member 1, or fragments, or derivatives, or variants thereof, as screening targets for reagents or compounds preventing, or treating, or ameliorating a neurodegenerative disease, preferably Alzheimer's disease.

17. Use of an antibody specifically immunoreactive with an immunogen, wherein said immunogen is a translation product of a gene coding for a cytosolic sulfotransferase family 4A member 1, SEQ ID NO. 1 or SEQ ID NO. 2, or a fragment, or derivative, or variant thereof, for detecting the pathological state of a cell in a sample obtained from a subject, comprising immunocytochemical staining of said cell with said antibody, wherein an altered degree of staining, or an altered staining pattern in said cell compared to a cell representing a known health status indicates a pathological state of said cell which relates to a neurodegenerative disease, preferably to Alzheimer's disease.